

REMARKS

Claims 14-27 have previously been allowed.

Claims 1, 3-9 and 28 have been amended. Claims 1, 3-28 are pending and presented for examination in this application.

Specification, Drawings

An objection to Figure 20 and the specification has been repeated with regard to items 11 and 12 of Fig. 20 being said to go unmentioned in the description. In the prior Rule 111 Amendment, Applicants proposed to remove reference signs 11 and 12 are to be removed from Fig. 20; the drawing itself is to remain the same. In the Final Office Action, at page 10, the Examiner has agreed with the proposed approach. A revised Fig. 20 is submitted herewith (or has been recently submitted) and this objection is believed to now be obviated.

Obviousness Rejections

At page 2, paragraph 4 of the Office Action, claims 1, 3, 4 and 6-11 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Burt et al. (USP 6,052,213) in view of Todori et al. (USP 6,002,522). The Examiner admits that "Burt is silent concerning the particular period to wavelength relation as stated in claim 1." (Final Office Action, page 3.)

At page 4, paragraph 5 of the Office Action, claims 1, 3 and 5-9 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. in view of Todori et al.

At page 6, paragraph 6 of the Office Action, claims 1, 3, 5, 6, 9-13, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Normandin in view of Todori et al.

Applicants respectfully traverse this obviousness rejections.

Neither reference teaches the function of the diffraction grating that the device separates a beam into beam components different in wavelength. The amendment to claim 1 and its dependent claims highlight this point.

Representative embodiments of Applicants' presently claimed invention according to

claim 1 provides unexpectedly superior results compared to representative embodiments of Burt, Inoue and Normandin. Namely, Applicants' diffraction grating of claim 1 can be used for separating a beam into beam components different in wavelength. Also, Applicants' diffraction grating of claim 1 can be used for separating a beam into beam components different in the direction of polarization.¹ Representative embodiments of Burt, Inoue and Normandin (namely, the cases permitted in Burt, Inoue and Normandin in which $\lambda/2n_M > a$) cannot be so used.

If the $\lambda/2n_M < a$ condition recited in Applicants' claim 1 is satisfied, the effect of photonic crystal can be fulfilled because a/λ_0 is larger than the band gap formed in the direction of lamination and near $\lambda_0/2n_M = a$. If the period a is smaller than the range represented by the condition in Applicants' claim 1, the characteristic of the multilayer structure becomes near to that of a homogeneous medium with the average refractive index.²

For example, using representative embodiments of Applicants' claim 1, the superprism effect can be achieved but when using representative embodiments of the primary references the superprism effect would not be achieved.

Under MPEP 716.02, the obviousness rejections should be withdrawn.

Additionally, Applicants further note the following. The Examiner has noted that Burt is silent "concerning the particular period to wavelength relation as stated in claim 1." (E.g., Final Office Action, page 3, regarding Burt.) However, it should be noted that Burt is silent about factoring in n_M as in Applicants' claim 1. As set forth in Applicants' claim 1, " n_M is an average refractive index in the one-period range of said multilayer structure in the wavelength λ ." Burt does not disclose working with an average refractive index. To the contrary, Burt uses a material with a variable refractive index in the photonic crystal in order for Burt's grating to function as a tuneable filter. (Col. 2, lines 65-67.) Burt works with one refractive index at a time (e.g., "a refractive index of 3.3", col. 4, lines 58-59), not with an "average" refractive index as in Applicants' claim 1.

¹Applicants' specification, page 1, lines 5-9.

²Applicants' specification, paragraph bridging pages 20-21.

Normandin also suffers from this deficiency, namely, Normandin does not disclose working with an "average" refractive index.

Inoue discloses working with an average refractive index n , which is not defined the same as Applicants' average refractive index n_M . Inoue discloses an equation $\Delta\theta = 4/n \lambda/l$ which of course is not the relationship in Applicants' claim 1.

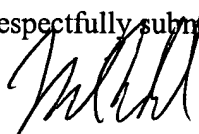
Accordingly, reconsideration and withdrawal of the obviousness rejections are respectfully requested.

In view of the foregoing, it is respectfully requested that the application be reconsidered, that allowance of claims 14-27 be repeated and that claims 1, 3-13 and 28 also be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephone or personal interview.

A provisional petition is hereby made for any extension of time necessary for the continued pendency during the life of this application. Please charge any fees for such provisional petition and any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,



Michael E. Whitham
Reg. No. 32,635

WHITHAM CURTIS &
CHRISTOFFERSON, P.C.
11491 Sunset Hills Rd., Suite 340
Reston, VA 20190
Tel. 703-787-9400

Amendments to the drawings

Attached hereto is an annotated drawing sheet for Figure 20 which eliminates extraneous numeric identifiers, and a substitute drawing sheet for Figure 20. Please amend the application to include the substitute drawing sheet of Figure 20.



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FIG.20

